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## THE PROGRESS OF SCIENCE

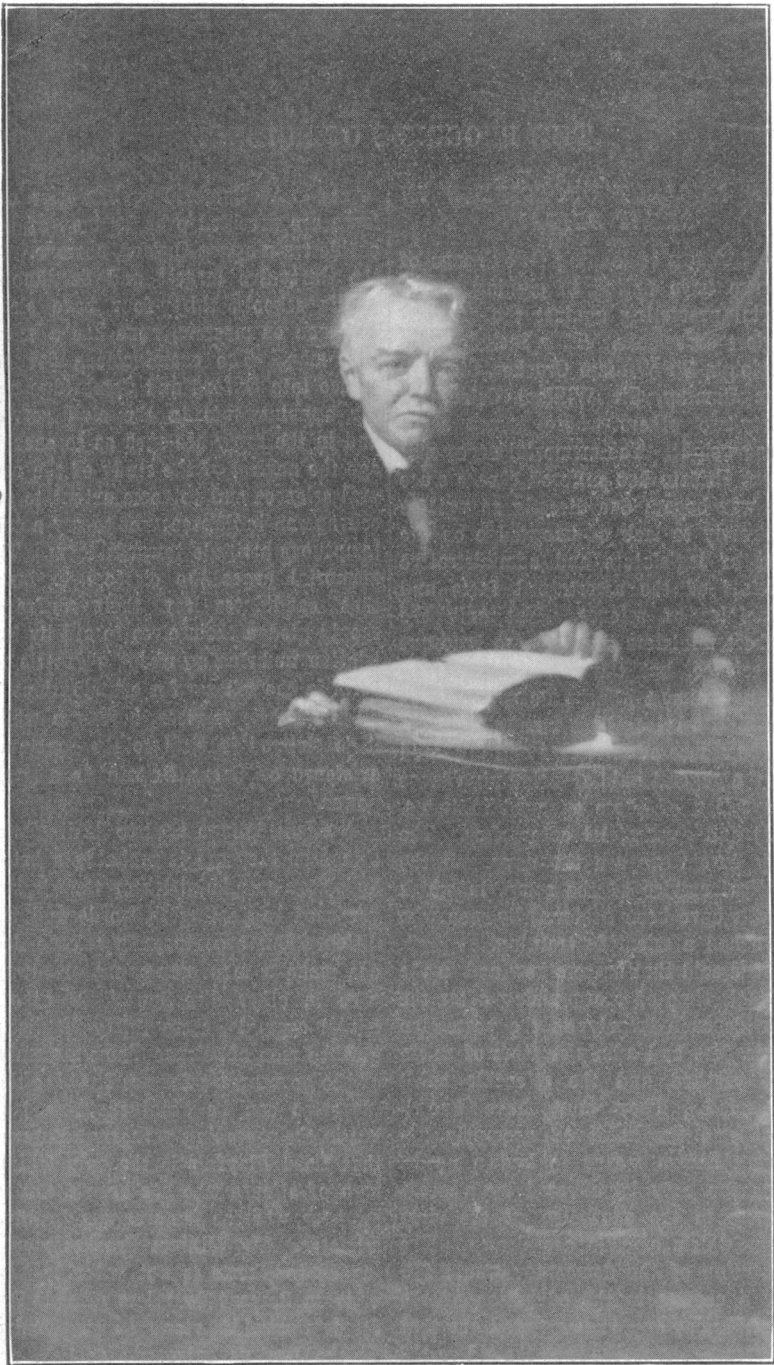
*THE NEGLECT OF SCIENCE IN GREAT BRITAIN*

A NUMBER of leading British men of science have united in signing a memorial protesting against the national neglect of science. They include Lord Rayleigh, Sir William Crookes, Sir William Ramsay, Sir William Osler and thirty-two others whose names carry great weight. The memorial urges that Great Britain has suffered checks since the war began, due directly as well as indirectly to lack of knowledge on the part of legislators and administrative officials of the ascertained facts and principles of science. Not only the highest ministers of state are ignorant of science, but the same defect runs through almost all the departments of the civil service; it is nearly universal in the House of Commons and is shared by the general public, including a large proportion of those engaged in industrial and commercial enterprises. The only exceptions are the navy and the medical service of the army, in which results have been achieved by men who have had a scientific training.

It is said that success now and in the difficult time of reorganizing after the war depends largely on the possession by leaders and administrators of scientific method and the scientific habit of mind. They must have knowledge and the habit of promptly applying known means to known needs. This can only be effected by a great change in the education of the class from which officials are drawn. The education of the democracy would follow a change in the education of the wealthy classes. It is pointed out that at present the methods of the old vested interests have retained their dominance at least as far as the ancient universities and the great schools are con-

cerned. At Cambridge, but four colleges are presided over by men of scientific training, at Oxford, not one. Of the thirty-five largest and best-known public schools, thirty-four have classical men as masters, none has a scientific man. The examinations for entrance into Oxford and Cambridge and for appointments in the civil service and in the army are such as to encourage the neglect of the study of the natural sciences and to some extent to encourage an indifferent not to say a contemptuous attitude towards them. The memorial urges the electors to insist that candidates for their suffrages should pledge themselves to aid by legislation in bringing about a drastic reform in the scheme for examinations in all the public services, a reform which it is claimed is vital to the continued existence of Great Britain as a great power.

A scientific man used to dealing with things as they are is probably a better legislator or administrator than a lawyer used to dealing in words and tradition. But expertness in science does not make a man omniscient or always wise in other directions. To take a trivial example, these thirty-six distinguished men of science blame a member of the government for not knowing that glycerine can be obtained from lard, but in the preceding paragraph they say that Lord Playfair is the only trained man of science who has been a cabinet minister, whereas he never was a cabinet minister. Sir William Crookes's opinion as to ghosts is not valuable. Sir William Ramsay doubtless regards Professor Ostwald's views on the conduct of the war as extremely foolish, and Professor Ostwald in turn doubtless looks on Sir William Ramsay's publications regarding the permanent sub-



PROFESSOR JOSIAH ROYCE, THE LATE PROFESSOR WILLIAM JAMES AND PROFESSOR GEORGE HERBERT PALMER. This painting of the three distinguished professors of philosophy of Harvard University by Mrs. Winifred Ruber will probably be purchased



by a group of alumni for presentation to the university. Professor Royce is seated on the left; Professor James is seated on the right; Professor Palmer is standing.

jection of Germany is beyond measure absurd.

There is no reason to suppose that the study of the classical languages is carried to excess in the United States, though a great deal of time is doubtless wasted in our schools on the elements of languages which are never learned or used. The classical curriculum dominates the German gymnasium more completely than it does the English public school. The number of people who can read Latin in Germany is far greater than the number in England, but in equal measure the number trained for research work in science is greater. According to Professor Vignon, of Lyons, there are for each 1,000 chemists in Germany 28 in France and 24 in England. What both Great Britain and the United States can learn from Germany is not so much substituting one kind of memory work for another in the schools and in civil service examinations, as the appreciation of the supreme value of research and the importance of depending on the expert in the field in which he is competent.

#### RECENT EXPERIMENTS IN AERODYNAMICS

THE Smithsonian Institution has just issued and sends us an abstract of an illustrated pamphlet containing a series of technical reports on experiments recently conducted in the wind tunnel for aerodynamics at the Massachusetts Institute of Technology, at Boston, Mass.

In writing on this wind tunnel itself, J. C. Hunsaker, assistant naval constructor, U. S. N., and instructor of aeronautics at the Institute, says that since it is difficult to carry on full scale experiments to investigate the aerodynamical characteristics of a proposed air-craft design, tests are made on small models, as in naval architecture. The experiments are further simplified by holding the models stationary in an artificial current of air with a maximum wind speed from 34 to 40 miles an hour, instead of towing

them at high speeds through still air to simulate actual flying conditions.

After a study of the principal aerodynamical laboratories of Europe, it was decided to reproduce at Boston the four-foot diameter wind tunnel of the National Physical Laboratory of Teddington, England, together with the aerodynamical balance and instruments used there for measuring velocity. In this connection the director of the English laboratory generously presented the detailed plans of the complete installation to the Massachusetts Institute of Technology. Mr. Hunsaker describes the wind tunnel, the aerodynamical balance, and explains some of the experiments and principles involved.

The second article of the series comprises notes on the dimensional theory of wind tunnel experiments, by Edgar Buckingham, of the U. S. Bureau of Standards, who defines the theories and principles involved, and suggests standardization of the methods employed.

In another report Mr. Hunsaker discusses the most common and convenient form of pressure anemometer, known as the Pitot tube, an instrument used in calculating the wind velocity from the pressure differences. He also describes the construction of an inclined manometer, a form of pressure gauge, used in the experiments.

Messrs. H. E. Rossell and D. W. Douglas report on their experiments concerning the adjustment of the velocity gradient across a section of the tunnel. Since in wind tunnel experiments it is essential that the velocity of the air striking different parts of the model under test, shall be the same, it was necessary after developing precise methods for measuring the velocity, to explore the cross-section of the tunnel to detect variations in velocity from point to point. The results of their experiments and the effects secured by the adjustment of a honeycomb grating, which straightened out the flow of air, are recorded.

Tests of the characteristic curves for